



TITLE: METHOD OF DETERMINING RESISTIVITY AND/OR DIELECTRIC VALUES OF AN EARTH FORMATION AS A FUNCTION OF POSITION WITHIN THE EARTH FORMATION
INVENTOR: S. Mark Haugland
SERIAL NO.: 10/086,043

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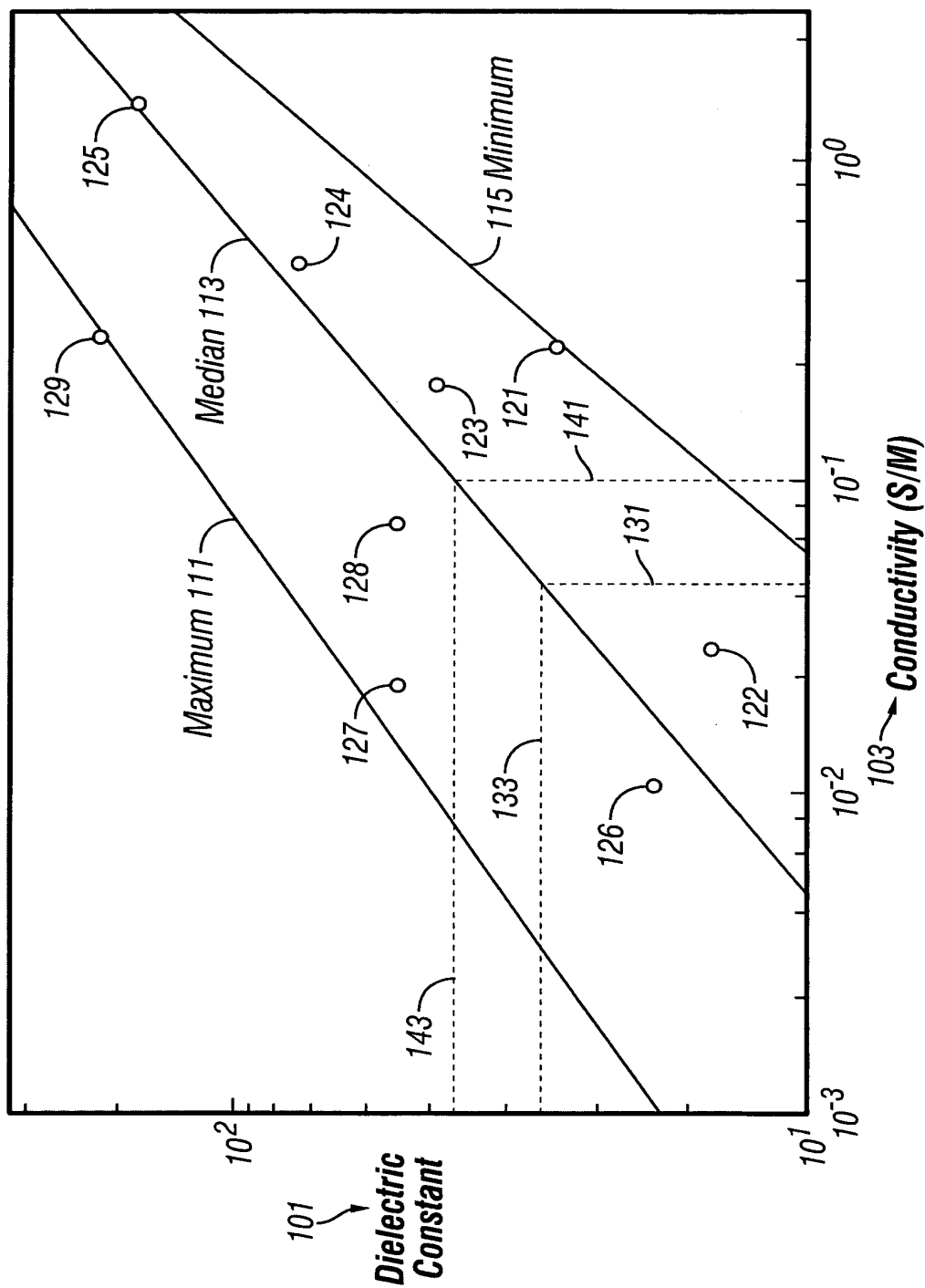


FIG. 1



TITLE: METHOD OF DETERMINING RESISTIVITY AND/OR DIELECTRIC VALUES OF AN EARTH FORMATION AS A FUNCTION OF POSITION WITHIN THE EARTH FORMATION
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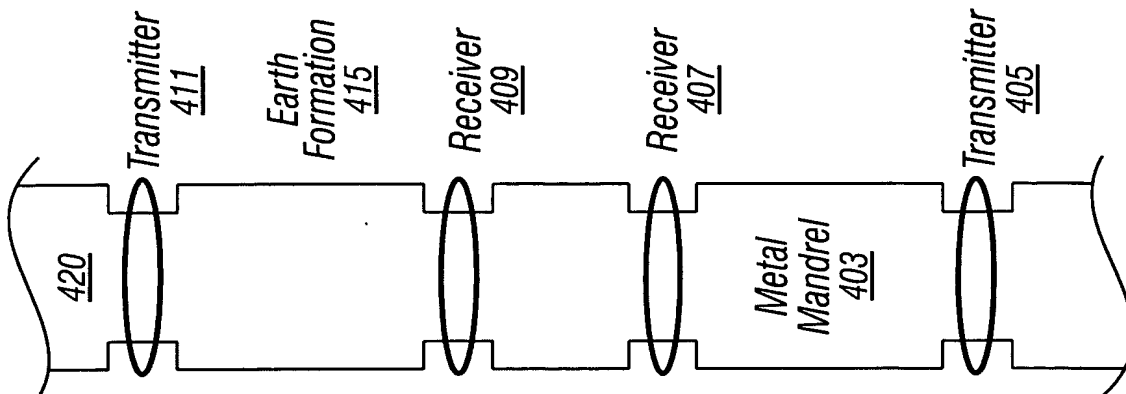


FIG. 4

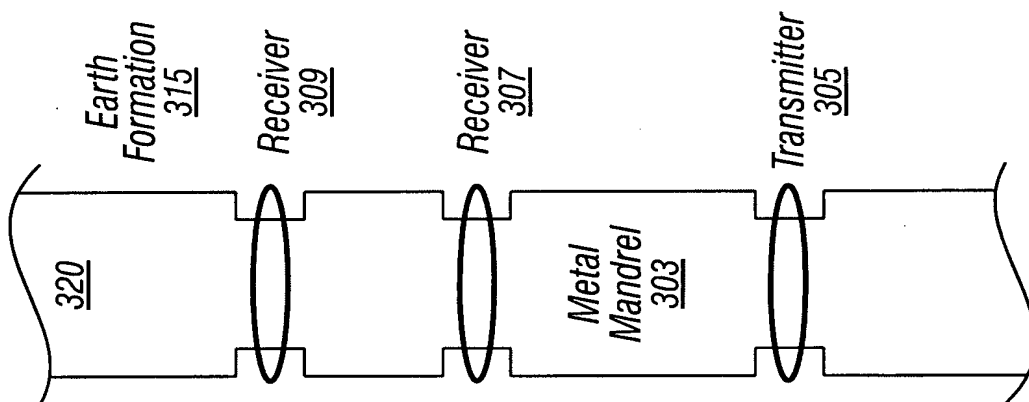


FIG. 3

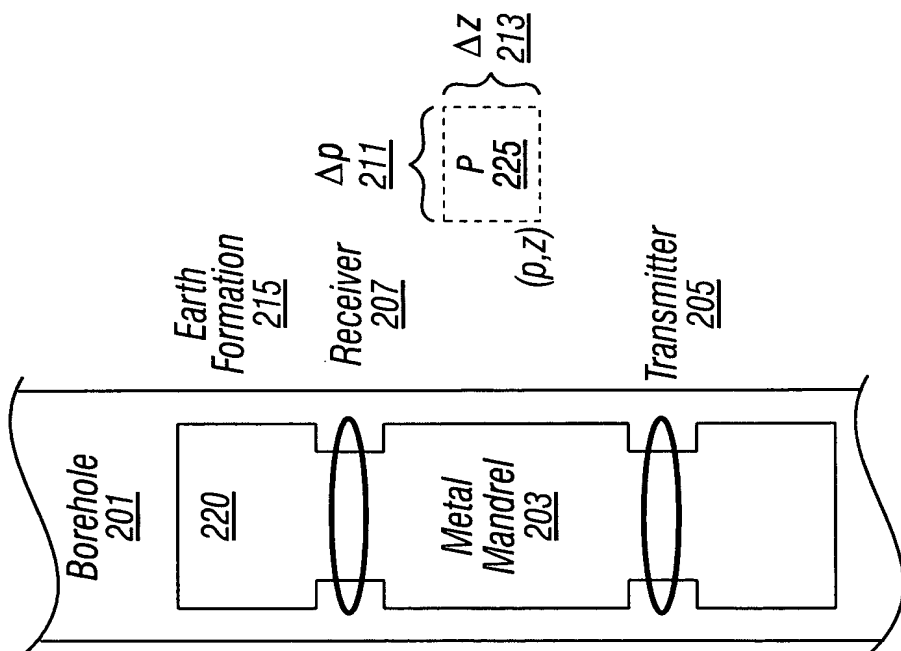
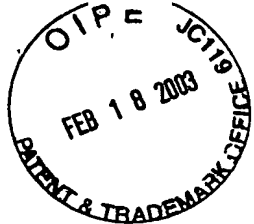


FIG. 2



TITLE: METHOD OF DETERMINING RESISTIVITY AND/OR DIELECTRIC VALUES
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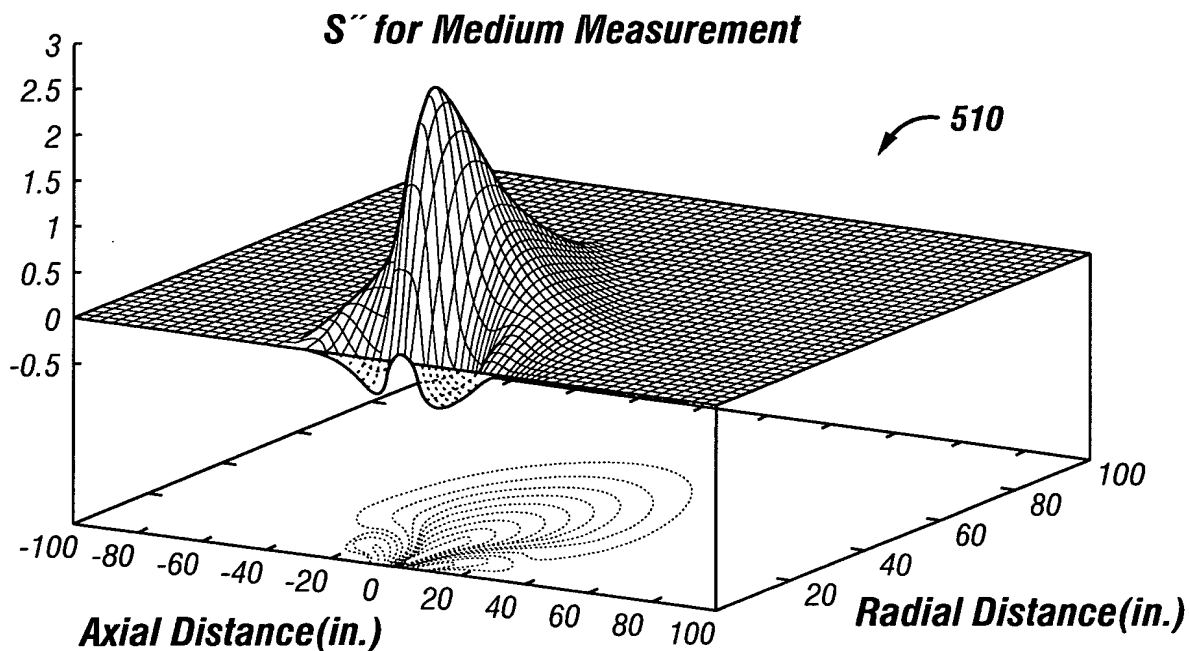


FIG. 5A

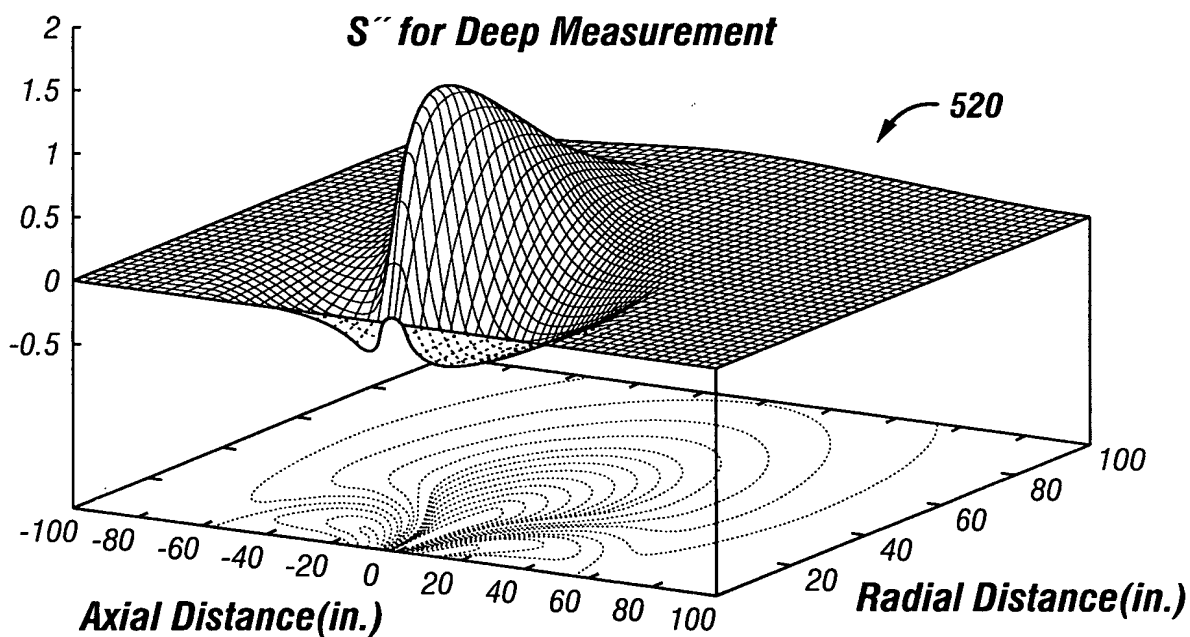


FIG. 5B



TITLE: METHOD OF DETERMINING RESISTIVITY AND/OR DIELECTRIC VALUES OF AN EARTH FORMATION AS A FUNCTION OF POSITION WITHIN THE EARTH FORMATION

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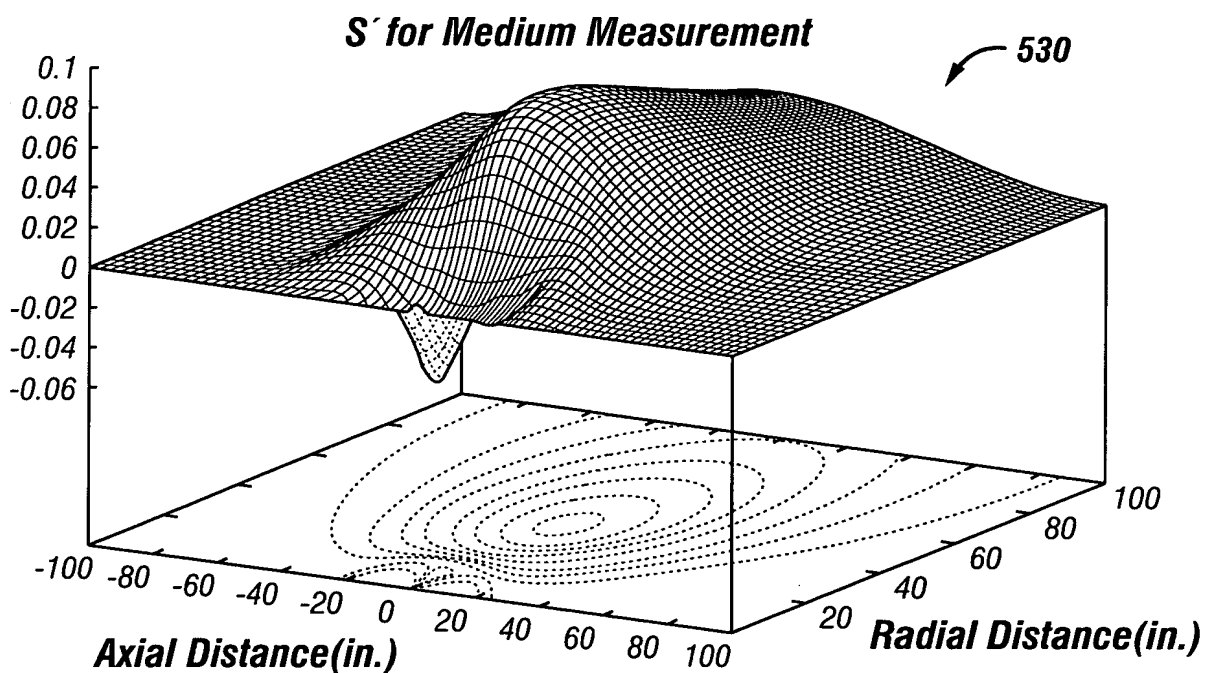


FIG. 5C

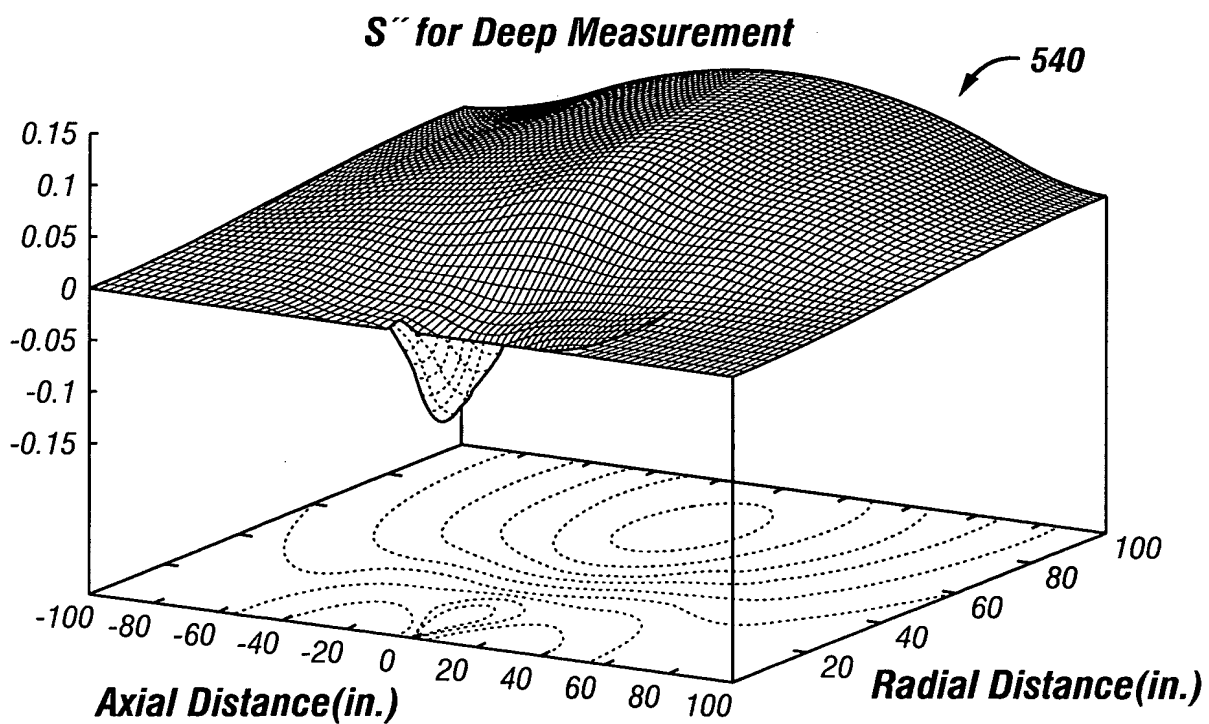
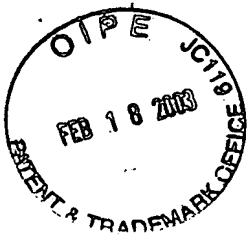


FIG. 5D



TITLE: METHOD OF DETERMINING RESISTIVITY AND/OR DIELECTRIC VALUES
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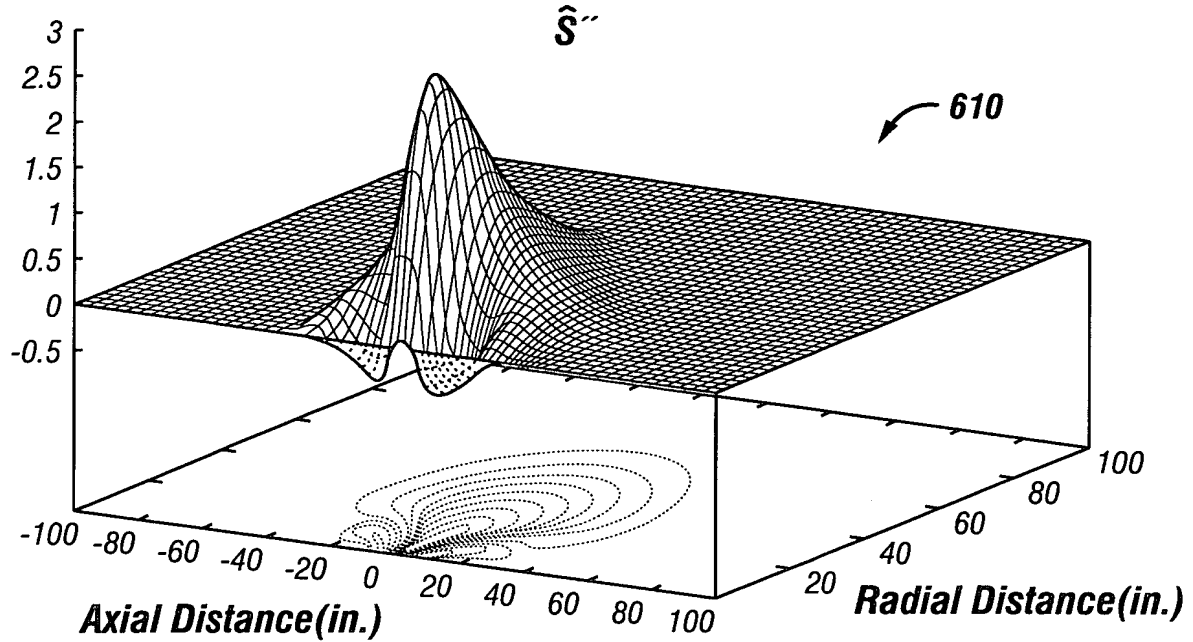


FIG. 6A

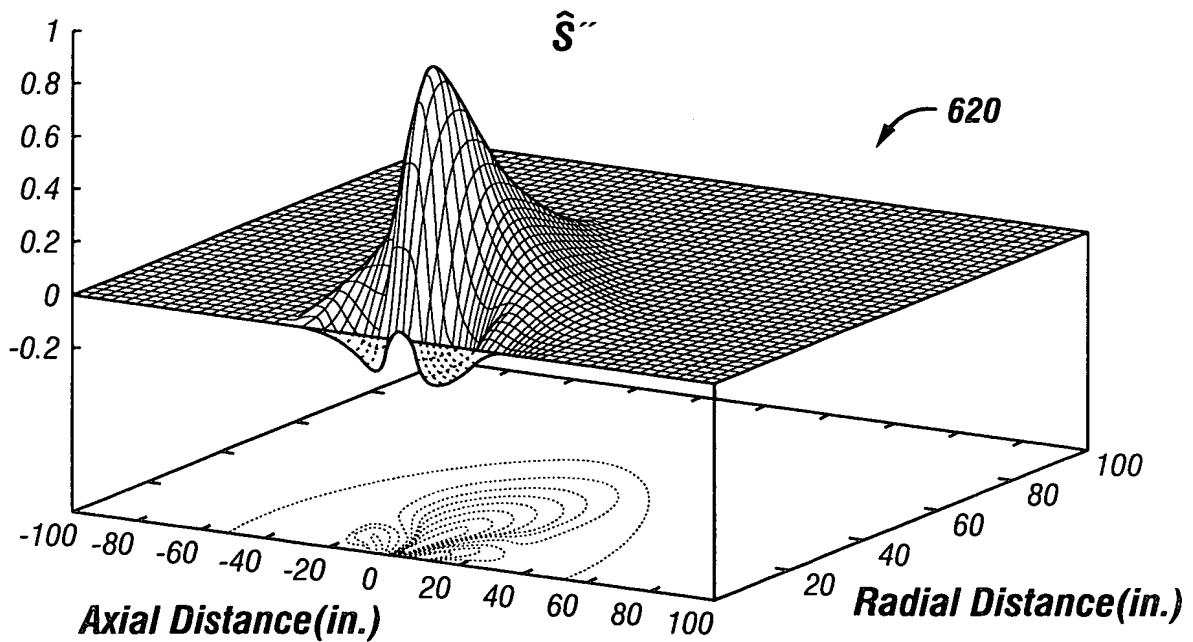


FIG. 6B



TITLE: METHOD OF DETERMINING RESISTIVITY AND/OR DIELECTRIC VALUES
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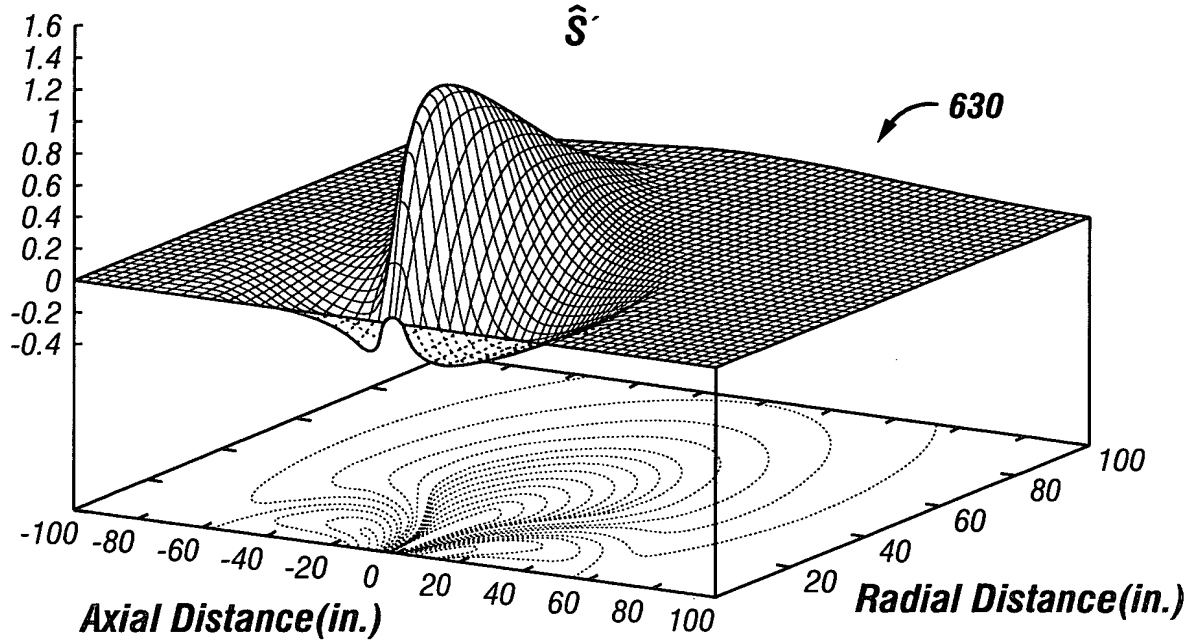


FIG. 6C

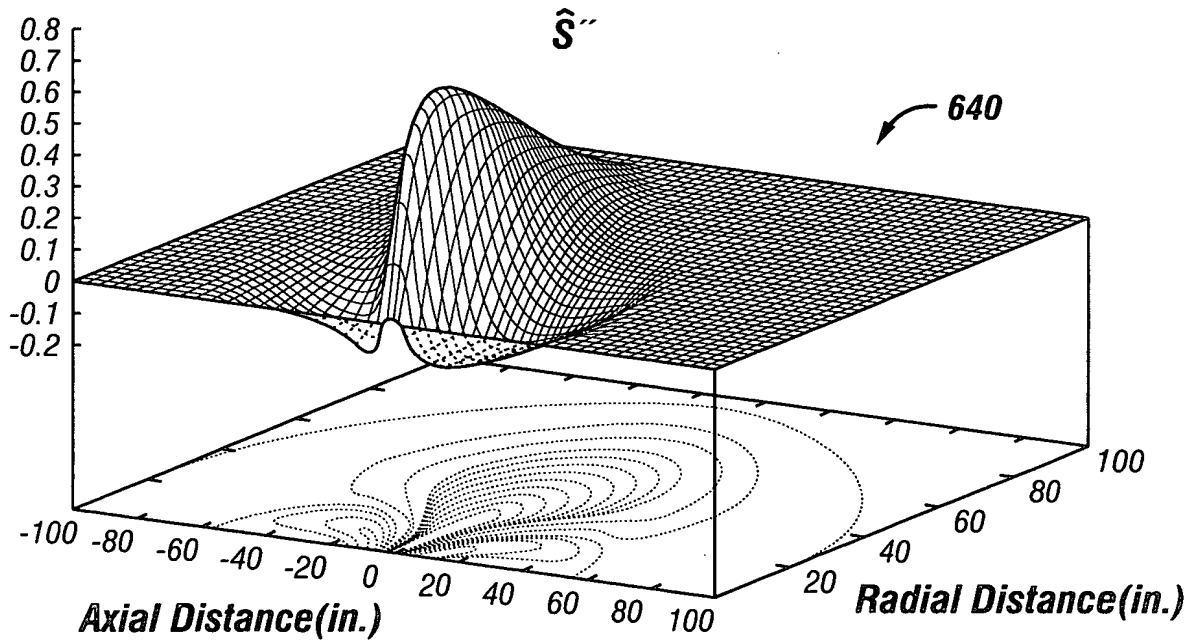


FIG. 6D



TITLE: METHOD OF DETERMINING RESISTIVITY AND/OR DIELECTRIC VALUES
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| Background sig0 | Medium eps0 | Deep Measurement | | Medium Measurement | |
|--------------------|----------------|------------------|--------|--------------------|--------|
| | | I[s'] | I[s''] | I[s'] | I[s''] |
| 5.000 | 10.0 | -0.159 | 0.160 | -0.155 | 0.163 |
| 2.000 | 10.0 | -0.249 | 0.255 | -0.235 | 0.261 |
| 1.000 | 10.0 | -0.346 | 0.363 | -0.313 | 0.373 |
| 0.500 | 10.0 | -0.476 | 0.519 | -0.400 | 0.528 |
| 0.200 | 10.0 | -0.701 | 0.833 | -0.506 | 0.810 |
| 0.100 | 10.0 | -0.897 | 1.18 | -0.555 | 1.07 |
| 0.050 | 10.0 | -1.09 | 1.64 | -0.564 | 1.35 |
| 0.020 | 10.0 | -1.27 | 2.39 | -0.518 | 1.70 |
| 0.010 | 10.0 | -1.32 | 3.01 | -0.458 | 1.92 |
| 0.005 | 10.0 | -1.32 | 3.61 | -0.397 | 2.10 |
| 5.000 | 50.0 | -0.159 | 0.160 | -0.155 | 0.162 |
| 2.000 | 50.0 | -0.249 | 0.255 | -0.235 | 0.261 |
| 1.000 | 50.0 | -0.347 | 0.363 | -0.314 | 0.372 |
| 0.500 | 50.0 | -0.479 | 0.517 | -0.402 | 0.527 |
| 0.200 | 50.0 | -0.710 | 0.826 | -0.513 | 0.807 |
| 0.100 | 50.0 | -0.923 | 1.17 | -0.573 | 1.07 |
| 0.050 | 50.0 | -1.15 | 1.61 | -0.600 | 1.35 |
| 0.020 | 50.0 | -1.46 | 2.33 | -0.598 | 1.71 |
| 0.010 | 50.0 | -1.17 | 2.91 | -0.593 | 1.94 |
| 0.005 | 50.0 | -1.98 | 3.41 | -0.605 | 2.12 |
| 5.000 | 100.0 | -0.159 | 0.160 | -0.155 | 0.162 |
| 2.000 | 100.0 | -0.249 | 0.255 | -0.235 | 0.260 |
| 1.000 | 100.0 | -0.348 | 0.362 | -0.315 | 0.371 |
| 0.500 | 100.0 | -0.482 | 0.515 | -0.405 | 0.526 |
| 0.200 | 100.0 | -0.721 | 0.818 | -0.523 | 0.804 |
| 0.100 | 100.0 | -0.953 | 1.15 | -0.595 | 1.06 |
| 0.050 | 100.0 | -1.23 | 1.57 | -0.645 | 1.34 |
| 0.020 | 100.0 | -1.68 | 2.21 | -0.699 | 1.70 |
| 0.010 | 100.0 | -2.07 | 2.63 | -0.751 | 1.91 |
| 0.005 | 100.0 | -2.45 | 2.89 | -0.808 | 2.05 |

FIG. 7



TITLE: METHOD OF DETERMINING RESISTIVITY AND/OR DIELECTRIC VALUES
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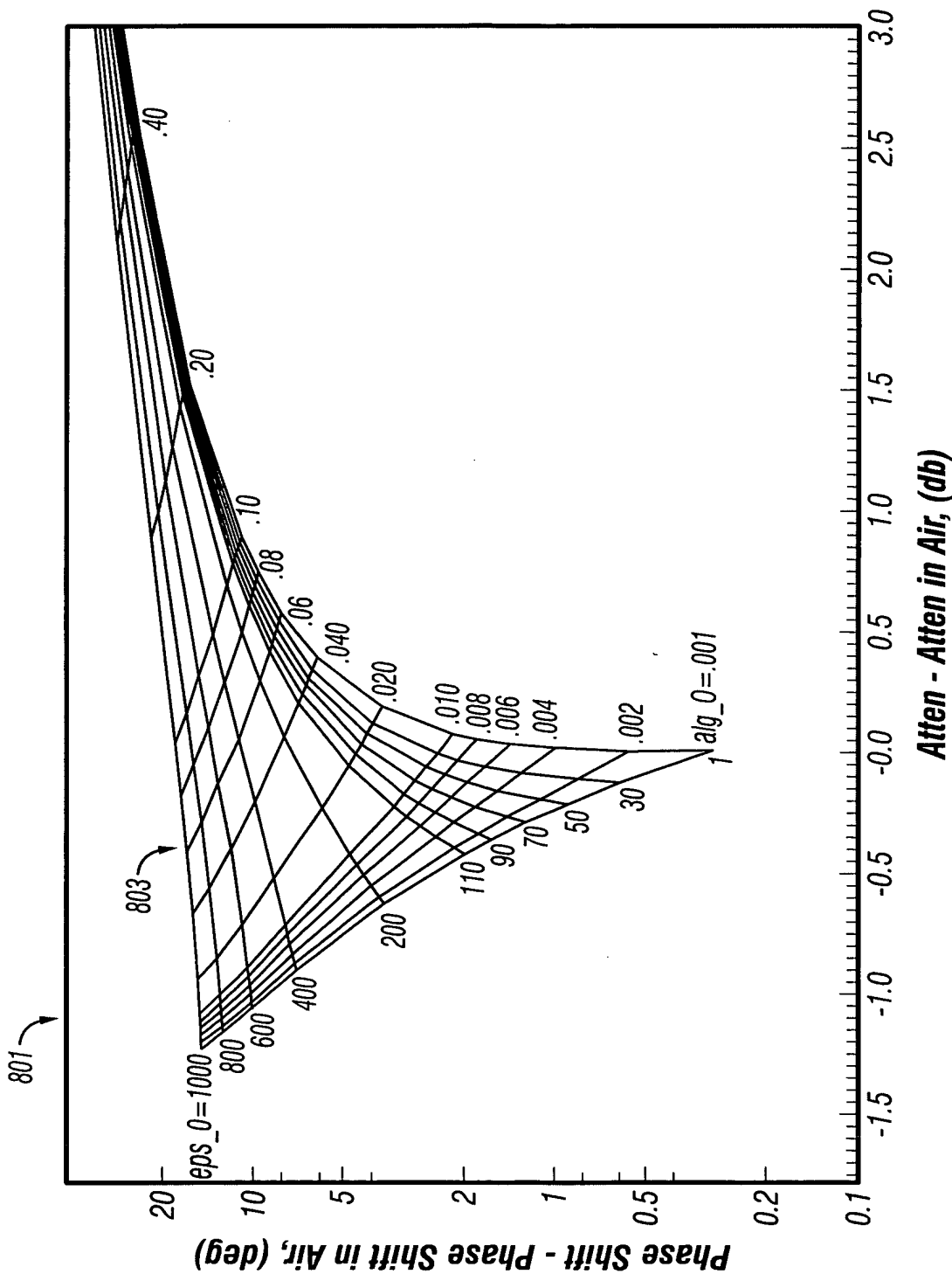


FIG. 8



TITLE: METHOD OF DETERMINING RESISTIVITY AND/OR DIELECTRIC VALUES
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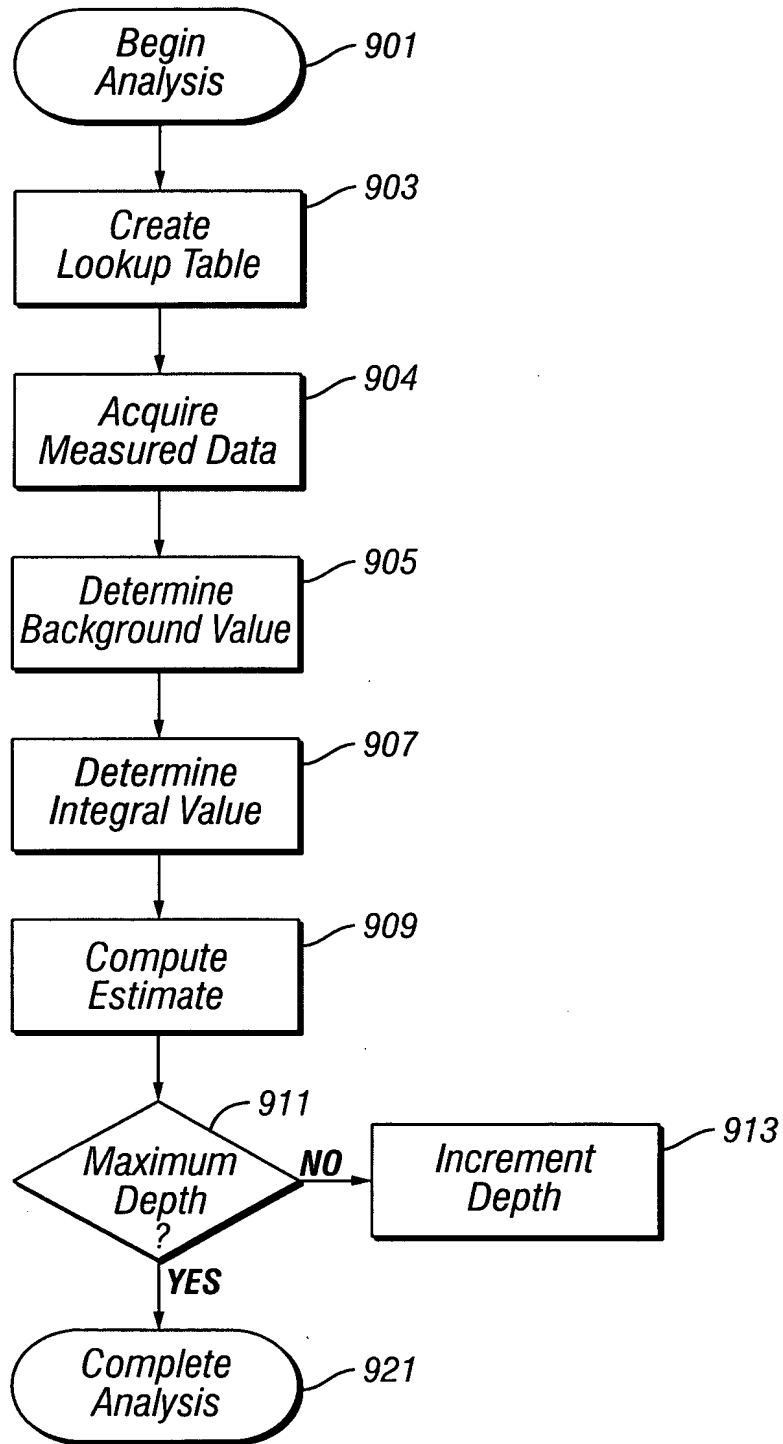


FIG. 9



TITLE: METHOD OF DETERMINING RESISTIVITY AND/OR DIELECTRIC VALUES
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| 1/sigma | eps_rel | db_pt | db_man | deg_pt | deg_man |
|---------|---------|-----------|-----------|----------|----------|
| 0.1 | 35 | 16.39681 | 16.34921 | 127.5789 | 126.7759 |
| 0.16 | 35 | 12.36776 | 12.35717 | 100.1192 | 99.43253 |
| 0.26 | 35 | 9.218385 | 9.238105 | 78.29757 | 77.74387 |
| 0.41 | 35 | 6.771087 | 6.813523 | 60.93389 | 60.52257 |
| 0.66 | 35 | 4.885574 | 4.94271 | 47.10585 | 46.83735 |
| 1.05 | 35 | 3.450289 | 3.51429 | 36.09731 | 35.96213 |
| 1.68 | 35 | 2.375379 | 2.439275 | 27.35548 | 27.33459 |
| 2.69 | 35 | 1.587098 | 1.645417 | 20.45383 | 20.52076 |
| 4.31 | 35 | 1.023677 | 1.072881 | 15.05909 | 15.18367 |
| 6.9 | 35 | 0.632716 | 0.671291 | 10.90276 | 11.05577 |
| 11.04 | 35 | 0.369951 | 0.398108 | 7.759132 | 7.91643 |
| 17.67 | 35 | 0.198911 | 0.218012 | 5.431487 | 5.576438 |
| 28.28 | 35 | 9.08E-02 | 0.10272 | 3.746272 | 3.870013 |
| 45.27 | 35 | 2.41E-02 | 3.07E-02 | 2.552769 | 2.652737 |
| 72.47 | 35 | -1.65E-02 | -1.36E-02 | 1.72462 | 1.802352 |
| 115.99 | 35 | -4.11E-02 | -4.07E-02 | 1.160437 | 1.219516 |
| 185.66 | 35 | -5.60E-02 | -5.74E-02 | 0.782376 | 0.826956 |
| 297.18 | 35 | -6.53E-02 | -6.78E-02 | 0.532895 | 0.566854 |
| 475.68 | 35 | -7.12E-02 | -7.44E-02 | 0.37062 | 0.397166 |
| 761.4 | 35 | -7.50E-02 | -7.86E-02 | 0.266387 | 0.287952 |
| 1218.73 | 35 | -7.73E-02 | -8.13E-02 | 0.200079 | 0.218386 |
| 1950.76 | 35 | -7.89E-02 | -8.30E-02 | 0.158176 | 0.174389 |
| 3122.48 | 35 | -7.98E-02 | -8.41E-02 | 0.131809 | 0.14669 |
| 4997.98 | 35 | -8.04E-02 | -8.48E-02 | 0.115262 | 0.129303 |
| 8000 | 35 | -8.08E-02 | -8.52E-02 | 0.104896 | 0.118408 |

FIG. 10



TITLE: METHOD OF DETERMINING RESISTIVITY AND/OR DIELECTRIC VALUES
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| 1/sigma | eps_rel | db_pt | db_man | deg_pt | deg_man |
|---------|---------|-----------|-----------|----------|----------|
| 500 | 10 | -1.64E-02 | -1.69E-02 | 0.286526 | 0.303246 |
| 500 | 12.47 | -2.18E-02 | -2.26E-02 | 0.292002 | 0.309431 |
| 500 | 15.55 | -2.86E-02 | -2.98E-02 | 0.299324 | 0.317704 |
| 500 | 19.39 | -3.71E-02 | -3.87E-02 | 0.309207 | 0.328873 |
| 500 | 24.18 | -4.78E-02 | -4.99E-02 | 0.322653 | 0.344071 |
| 500 | 30.16 | -6.10E-02 | -6.37E-02 | 0.341062 | 0.364877 |
| 500 | 37.61 | -7.75E-02 | -8.10E-02 | 0.36638 | 0.393481 |
| 500 | 46.9 | -9.79E-02 | -0.1023 | 0.40128 | 0.43288 |
| 500 | 58.48 | -0.12309 | -0.12865 | 0.449408 | 0.487148 |
| 500 | 72.93 | -0.15417 | -0.16101 | 0.515698 | 0.561768 |
| 500 | 90.94 | -0.19227 | -0.20057 | 0.606764 | 0.664038 |
| 500 | 113.41 | -0.23871 | -0.24861 | 0.731372 | 0.803555 |
| 500 | 141.42 | -0.29495 | -0.30651 | 0.900999 | 0.992753 |
| 500 | 176.36 | -0.36254 | -0.37568 | 1.130442 | 1.24747 |
| 500 | 219.92 | -0.44301 | -0.45747 | 1.438431 | 1.58746 |
| 500 | 274.25 | -0.53778 | -0.55303 | 1.848175 | 2.036773 |
| 500 | 342 | -0.64802 | -0.66312 | 2.387711 | 2.623872 |
| 500 | 426.48 | -0.77442 | -0.78801 | 3.089918 | 3.38135 |
| 500 | 531.83 | -0.91703 | -0.92722 | 3.992076 | 4.345172 |
| 500 | 663.21 | -1.07503 | -1.07943 | 5.134856 | 5.5534 |
| 500 | 827.04 | -1.24665 | -1.24246 | 6.560776 | 7.044546 |
| 500 | 1031.34 | -1.42914 | -1.41329 | 8.312291 | 8.855778 |
| 500 | 1286.11 | -1.61887 | -1.5883 | 10.42983 | 11.02138 |
| 500 | 1603.81 | -1.81159 | -1.76358 | 12.95017 | 13.57184 |
| 500 | 2000 | -2.00282 | -1.93525 | 15.90568 | 16.53382 |

FIG. 11



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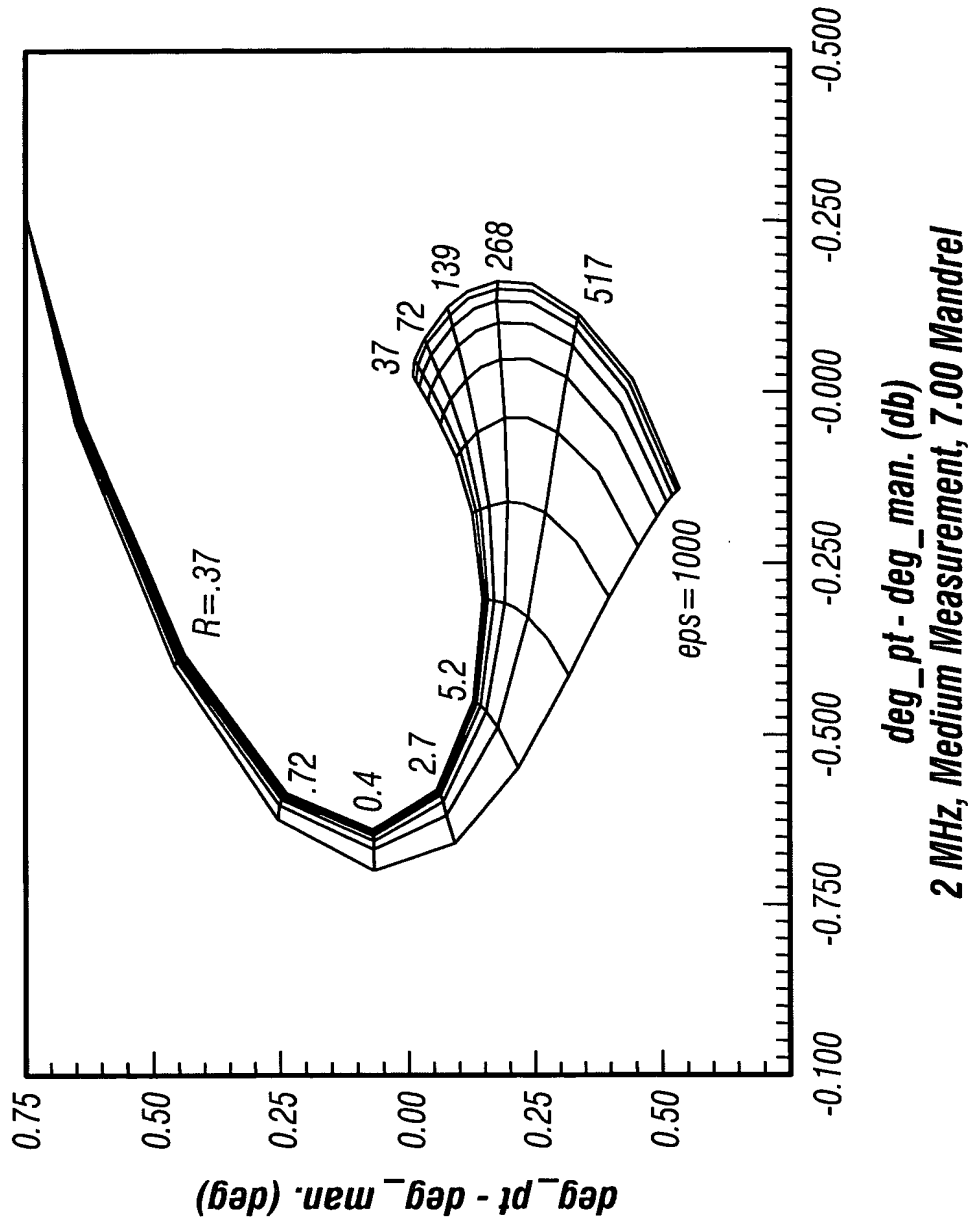


FIG. 12



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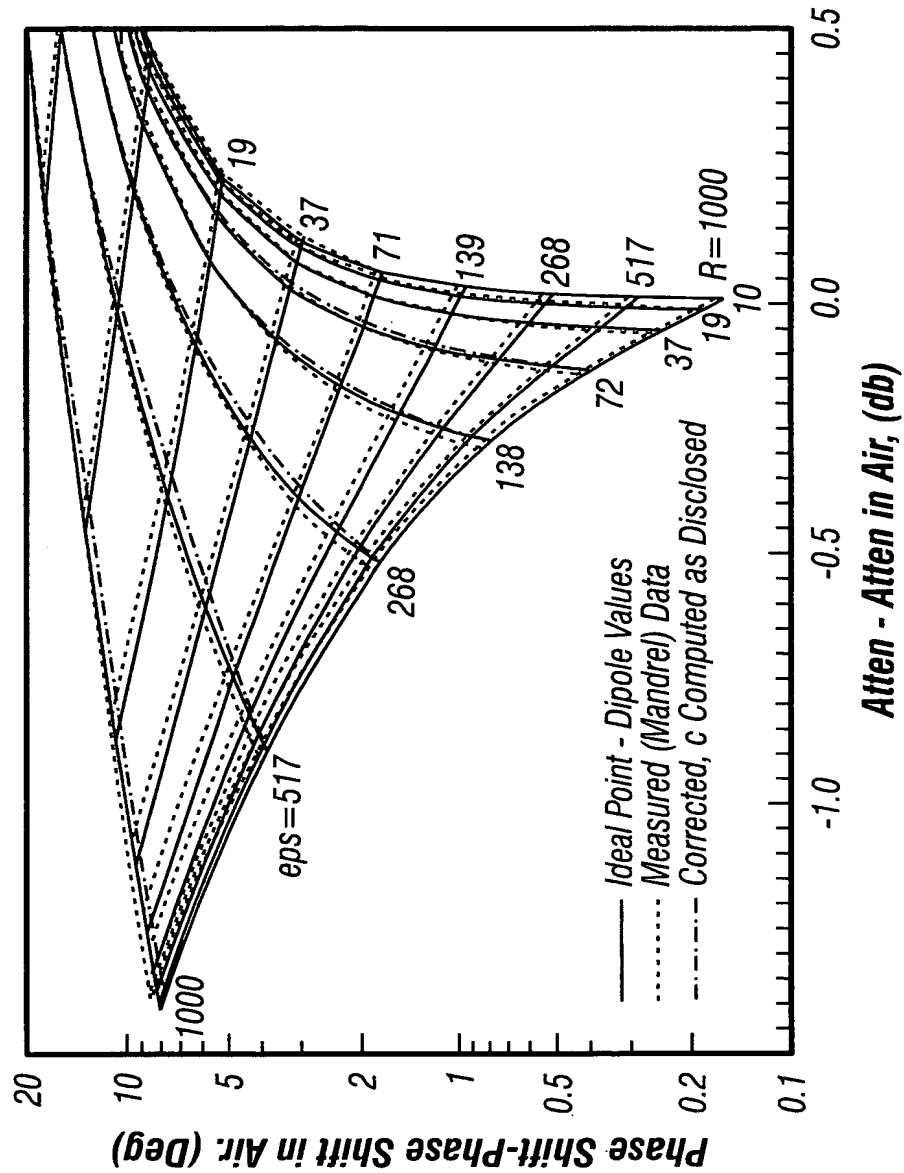


FIG. 13